

Dresden Nuclear Power Station

6500 North Dresden Road Morris, IL 60450 815 942 2920 Telephone www.exeloncorp.com

10 CFR 50.73

SVPLTR # 14-0053

October 24, 2014

U. S. Nuclear Regulatory Commission ATTN: Document Control Desk Washington, DC 20555-0001

Dresden Nuclear Power Station, Unit 2

Renewed Facility Operating License No. DPR-19

NRC Docket No. 50-237

Subject:

Licensee Event Report 237/2014-003-02, Unit 2 Reactor Scram during Automatic

Voltage Regulator Channel Transfer

Enclosed is Licensee Event Report 237/2014-003-02, Unit 2 Reactor Scram during Automatic Voltage Regulator Channel Transfer. This final report describes an event which is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B).

There are no regulatory commitments contained in this submittal.

Should you have any questions concerning this letter, please contact Mr. Bruce Franzen at (815) 416-2800.

Respectfully,

Shane M. Marik
Site Vice President

Dresden Nuclear Power Station

Enclosure Licensee Event Report 237/2014-003-02

cc: Regional Administrator - NRC Region III

NRC Senior Resident Inspector - Dresden Nuclear Power Station

TE22 MRR

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017 NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION 02-2014) Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by LICENSEE EVENT REPORT (LER) internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and (See Page 2 for required number of Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB digits/characters for each block) control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection. 1. FACILITY NAME 2. DOCKET NUMBER 3. PAGE 1 OF 4 Dresden Nuclear Power Station, Unit 2 05000237 4. TITLE Unit 2 Reactor Scram during Automatic Voltage Regulator Channel Transfer 5. EVENT DATE 7. REPORT DATE 8. OTHER FACILITIES INVOLVED 6. LER NUMBER FACILITY NAME DOCKET NUMBER SEQUENTIAL REV YEAR MONTH MONTH DAY YEAR DAY YFAR NUMBER FACILITY NAME 05 03 2014 2014 -003 02 10 24 14 9. OPERATING MODE 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) 20.2203(a)(3)(i) 50.73(a)(2)(i)(C) 50.73(a)(2)(vii) 20,2201(b) 20.2201(d) 20.2203(a)(3)(ii) 50.73(a)(2)(ii)(A) 50.73(a)(2)(viii)(A) 20.2203(a)(1) 20.2203(a)(4) 50.73(a)(2)(ii)(B) 50.73(a)(2)(viii)(B) 50.73(a)(2)(iii) 20.2203(a)(2)(i) 50.36(c)(1)(i)(A) 50.73(a)(2)(ix)(A) 50.73(a)(2)(iv)(A) 10. POWER LEVEL 20.2203(a)(2)(ii) 50.36(c)(1)(ii)(A) 50.73(a)(2)(x) 73.71(a)(4) 20.2203(a)(2)(iii) 50.36(c)(2) 50.73(a)(2)(v)(A) 50.73(a)(2)(v)(B) 50.46(a)(3)(ii) 73.71(a)(5) 20.2203(a)(2)(iv) 100 20.2203(a)(2)(v) 50.73(a)(2)(i)(A) 50.73(a)(2)(v)(C) OTHER Specify in Abstract below or in 50.73(a)(2)(i)(B) 50.73(a)(2)(v)(D) 20.2203(a)(2)(vi) NRC Form 366A 12. LICENSEE CONTACT FOR THIS LER LICENSEE CONTACT

Bruce Franzen – Regulatory Assurance Manager

TELEPHONE NUMBER (Include Area Code)

815-416-2800

DATE

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT MANU-FACTURER REPORTABLE TO EPIX MANU-REPORTABLE CAUSE SYSTEM COMPONENT COMPONENT FACTURER TO EPIX EL Υ Χ 90 A576 14. SUPPLEMENTAL REPORT EXPECTED 15. EXPECTED MONTH YEAR SUBMISSION YES (If yes, complete 15. EXPECTED SUBMISSION DATE)

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 03, 2014, Dresden Station was performing a channel swap of the Unit 2 Automatic Voltage Regulator (AVR). While attempting to perform the channel swap, the AVR unexpectedly switched to manual mode which resulted in exciter VARS rapidly decreasing. An automatic reactor protection system actuation, Turbine/Generator Trip, was received and all rods inserted to their full-in position. Following the reactor trip, all systems operated as expected.

The cause of this event was determined to be attributed to insufficient validation of vendor products following major equipment upgrades to ensure reliability of the newly installed equipment. Affected components were replaced, and the Automatic Voltage Regulator was successfully tested. Additionally, procedural guidance is being implemented to address risks associated with vendor, sub-vendor design, and technical products including risks associated with digital technology.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the system listed in paragraph (a)(2)(iv)(B).

NRC FORM 366A (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 01/31/2017

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 2055-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Dresden Nuclear Power Station, Unit 2	05000237	YEAR	SEQUENTIAL NUMBER	REV NO.		OF	4
	05000237	2014	- 003 -	02	2	OF	4

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

Dresden Nuclear Power Station (DNPS), Unit 2, is a General Electric Company Boiling Water Reactor with a licensed maximum power level of 2957 megawatts thermal. The Energy Industry Identification System codes used in the text are identified as [XX].

A. Plant Conditions Prior to Event:

Unit: 02

Event Date: 05-03-2014

Event Time: 1209 hours CDT

Reactor Mode: 1

Mode Name: Power Operation

Power Level: 100 percent

B. Description of Event:

On 04/29/14 at approximately 0943 hours, U2 experienced an electrical transient which resulted in a generator excitation step change and an increase from 180 MVAR to 350 MVAR. A team was assembled to perform complex troubleshooting of Automatic Voltage Regulator [EL] (AVR) components. Troubleshooting was performed based on vendor recommendations and the data was used to hypothesize the component failure. Based on the troubleshooting completed, it was identified that AVR Channel 2 was not functioning properly. In addition, a 3 percent mismatch was identified between Channel 1 and Channel 2 AVR output.

The decision was made to make Channel 1 match Channel 2 by raising the low limiter set-point and then force the channel swap. The transfer procedure was reviewed and approved by Dresden and seven revisions were issued to address comments. Several Technical calls were conducted to validate the recommended AVR channel swap actions. The troubleshooting team had determined a phase was missing in the AC power to the AVR converter bridge it was determined the channel transfer should only be performed if all the fuses for the 480 Volt input sources were intact.

During the channel transfer, generator excitation voltage started to decrease. When the AVR was switched from Channel 2 to Channel 1, it automatically swapped back to channel 2 and transferred into manual control. Main Generator MVARS dropped to -200 MVARs and began swinging from -400 MVARs to -200 MVARs.

Operations unsuccessfully attempted to manually raise MVARS. The Main Generator Out-Of-Step Relay actuated resulting in a Main Generator trip and reactor Scram. Subsequent review identified that a logic block feedback circuit was not accounted for when developing the channel transfer procedure.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the system listed in paragraph (a)(2)(iv)(B).

NRC FORM 366A

(02-2014)

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

11 0	NUICI		DECIII	ATODV	COMMISSION
U.S.	NUCL	EAH.	REGUL	AIUHI	COMMISSION

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Ducadon Nucleau Dower Station Unit 0	0500022	YEAR	SEQUENTIAL NUMBER	REV NO.	,	OF	4
Dresden Nuclear Power Station, Unit 2	05000237	2014	- 003 -	02	٥	OF-	4

NARRATIVE

C. Cause of Event:

The Root Cause of this event was determined to be attributed to insufficient validation of vendor products, following major equipment upgrades, to ensure reliability of the newly installed equipment.

Vendor equipment design details require high reliance on vendor support to understand, operate and troubleshoot equipment anomalies.

Site personnel could not perform an independent failure analysis because the proprietary information was not readily available. In addition, vendor supplied simulator equipment was not designed to replicate actual conditions that existed during troubleshooting. Therefore, the cause of some anomalies could not be validated, resulting in additional vendor reliance.

The root cause also identified four contributing cause:

- 1. Insufficient risk factor assessment for designs which are highly reliant on vendor expertise or vendor provided complex digital technology.
- 2. The Unitrol 6000 Dresden Unit 2 Channel Transfer Procedure provided by the vendor was inadequate.
- 3. Automatic Voltage Regulator did not meet all design requirements.
- 4. Less-than-adequate Automatic Voltage Regulator Factory Acceptance Test and Site Acceptance Test.

D. Safety Analysis:

The Conditional Core Damage Probability (CCDP) associated with the automatic reactor scram was minimal because the key mitigating systems were available. In this event, mitigating systems were not impacted and were available during the reactor shutdown. Therefore, this event was considered non-risk significant and the safety significance of this event was considered minimal.

NRC FORM 366A

(02-2014)

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

U.S. NUCLEA	REGULATO	ORY COMMISSION
-------------	----------	----------------

1. FACILITY NAME 2. DOCKET 6. LER NUMBER			3. PAGE				
Dreaden Nuclear Damer Chatian Unit 0	05000237	YEAR	SEQUENTIAL NUMBER	REV NO.	4	OF 4	4
Dresden Nuclear Power Station, Unit 2		2014	- 003 -	02			4

NARRATIVE

E. Corrective Actions:

Affected components were replaced during the force outage. The Automatic Voltage Regulator was successfully tested and it has been operating since May of 2014.

The Corrective Action to Prevent Recurrence (CAPR) is to revise HU-AA-1212, titled Technical Task Risk/Rigor Assessment, Pre-Job Brief, Independent Third Party Review and Post-Job Brief, to address risks associated with vendor / sub-vendor design / technical products including risks associated with digital technology.

A Corrective Action has been created to generate procedure guidance for performing a channel swap with a degraded AVR.

F. <u>Previous Occurrences</u>:

There have been no similar events at the same plant. This event is isolated to the ABB Unitrol 6000 equipment. The equipment involved in this event was installed in November of 2013 and therefore no other similar events have been recorded.

G. Component Failure Data:

Manufacturer	Model	S/N	Туре
ABB	Unitrol 6080	101681-842-1	ı